

**$D^*(2010)^{\pm}$** 
 $I(J^P) = \frac{1}{2}(1^-)$   
*I, J, P* need confirmation.
 **$D^*(2010)^{\pm}$  MASS**

The fit includes  $D^{\pm}$ ,  $D^0$ ,  $D_s^{\pm}$ ,  $D^{*\pm}$ ,  $D^{*0}$ , and  $D_s^{*\pm}$  mass and mass difference measurements.

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
<b>2010.27±0.17 OUR FIT</b>	Error includes scale factor of 1.1.			
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2008 ± 3	<sup>1</sup> GOLDHABER 77	MRK1	±	$e^+ e^-$
2008.6 ± 1.0	<sup>2</sup> PERUZZI 77	MRK1	±	$e^+ e^-$
<sup>1</sup> From simultaneous fit to $D^*(2010)^+$ , $D^*(2007)^0$ , $D^+$ , and $D^0$ ; not independent of FELDMAN 77B mass difference below.				
<sup>2</sup> PERUZZI 77 mass not independent of FELDMAN 77B mass difference below and PERUZZI 77 $D^0$ mass value.				

 **$m_{D^*(2010)^+} - m_{D^+}$** 

The fit includes  $D^{\pm}$ ,  $D^0$ ,  $D_s^{\pm}$ ,  $D^{*\pm}$ ,  $D^{*0}$ , and  $D_s^{*\pm}$  mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>140.64±0.10 OUR FIT</b>	Error includes scale factor of 1.1.			
<b>140.64±0.08±0.06</b>	620	BORTOLETTO92B	CLE2	$e^+ e^- \rightarrow$ hadrons

 **$m_{D^*(2010)^+} - m_{D^0}$** 

The fit includes  $D^{\pm}$ ,  $D^0$ ,  $D_s^{\pm}$ ,  $D^{*\pm}$ ,  $D^{*0}$ , and  $D_s^{*\pm}$  mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>145.421±0.010 OUR FIT</b>	Error includes scale factor of 1.1.			
<b>145.421±0.010 OUR AVERAGE</b>				
145.412±0.002±0.012		ANASTASSOV 02	CLE2	$D^{*\pm} \rightarrow D^0 \pi^{\pm} \rightarrow (K\pi) \pi^{\pm}$
145.54 ± 0.08	611	<sup>3</sup> ADINOLFI	99	BEAT $D^{*\pm} \rightarrow D^0 \pi^{\pm}$
145.45 ± 0.02		<sup>3</sup> BREITWEG	99	ZEUS $D^{*\pm} \rightarrow D^0 \pi^{\pm} \rightarrow (K\pi) \pi^{\pm}$
145.42 ± 0.05		<sup>3</sup> BREITWEG	99	ZEUS $D^{*\pm} \rightarrow D^0 \pi^{\pm} \rightarrow (K^- 3\pi) \pi^{\pm}$
145.5 ± 0.15	103	<sup>4</sup> ADLOFF	97B	H1 $D^{*\pm} \rightarrow D^0 \pi^{\pm}$
145.44 ± 0.08	152	<sup>4</sup> BREITWEG	97	ZEUS $D^{*\pm} \rightarrow D^0 \pi^{\pm}$ ,
145.42 ± 0.11	199	<sup>4</sup> BREITWEG	97	ZEUS $D^{*\pm} \rightarrow D^0 \pi^{\pm}$ ,
145.4 ± 0.2	48	<sup>4</sup> DERRICK	95	ZEUS $D^{*\pm} \rightarrow D^0 \pi^{\pm}$

145.39	$\pm 0.06$	$\pm 0.03$		BARLAG	92B	ACCM	$\pi^-$	230 GeV
145.5	$\pm 0.2$		115	<sup>4</sup> ALEXANDER	91B	OPAL	$D^*\pi^\pm \rightarrow D^0\pi^\pm$	
145.30	$\pm 0.06$			<sup>4</sup> DECAMP	91J	ALEP	$D^*\pi^\pm \rightarrow D^0\pi^\pm$	
145.40	$\pm 0.05$	$\pm 0.10$		ABACHI	88B	HRS	$D^*\pi^\pm \rightarrow D^0\pi^\pm$	
145.46	$\pm 0.07$	$\pm 0.03$		ALBRECHT	85F	ARG	$D^*\pi^\pm \rightarrow D^0\pi^+$	
145.5	$\pm 0.3$		28	BAILEY	83	SPEC	$D^*\pi^\pm \rightarrow D^0\pi^\pm$	
145.5	$\pm 0.3$		60	FITCH	81	SPEC	$\pi^- A$	
145.3	$\pm 0.5$		30	FELDMAN	77B	MRK1	$D^{*+} \rightarrow D^0\pi^+$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

145.44	$\pm 0.09$		122	<sup>4</sup> BREITWEG	97B	ZEUS	$D^*\pi^\pm \rightarrow D^0\pi^\pm,$	
							$D^0 \rightarrow K^-\pi^+$	
145.8	$\pm 1.5$		16	AHLEN	83	HRS	$D^{*+} \rightarrow D^0\pi^+$	
145.1	$\pm 1.8$		12	BAILEY	83	SPEC	$D^*\pi^\pm \rightarrow D^0\pi^\pm$	
145.1	$\pm 0.5$		14	BAILEY	83	SPEC	$D^*\pi^\pm \rightarrow D^0\pi^\pm$	
145.5	$\pm 0.5$		14	YELTON	82	MRK2	$29 e^+e^- \rightarrow K^-\pi^+$	
$\sim 145.5$				AVERY	80	SPEC	$\gamma A$	
145.2	$\pm 0.6$		2	BLIETSCHAU	79	BEBC	$\nu p$	

<sup>3</sup> Statistical errors only.

<sup>4</sup> Systematic error not evaluated.

### $m_{D^*(2010)^+} - m_{D^*(2007)^0}$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

2.6 $\pm 1.8$	5 PERUZZI	77	MRK1 $e^+e^-$
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<sup>5</sup> Not independent of FELDMAN 77B mass difference above, PERUZZI 77  $D^0$  mass, and GOLDHABER 77  $D^*(2007)^0$  mass.

### $D^*(2010)^\pm$ WIDTH

VALUE (keV)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>96<math>\pm 4\pm 22</math></b>			ANASTASSOV 02	CLE2	$D^*\pi^\pm \rightarrow D^0\pi^\pm \rightarrow (K\pi)\pi^\pm$

• • • We do not use the following data for averages, fits, limits, etc. • • •

<131	90	110	BARLAG	92B	ACCM	$\pi^-$	230 GeV
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### $D^*(2010)^\pm$ DECAY MODES

$D^*(2010)^-$  modes are charge conjugates of the modes below.

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $D^0\pi^+$	(67.7 $\pm 0.5$ ) %
$\Gamma_2$ $D^+\pi^0$	(30.7 $\pm 0.5$ ) %
$\Gamma_3$ $D^+\gamma$	( 1.6 $\pm 0.4$ ) %

## CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 6 measurements and one constraint to determine 3 parameters. The overall fit has a  $\chi^2 = 0.3$  for 4 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients  $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$ , in percent, from the fit to the branching fractions,  $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$ . The fit constrains the  $x_i$  whose labels appear in this array to sum to one.

$$\begin{array}{c|cc} & -62 & \\ x_2 & -43 & -44 \\ \hline x_3 & & \\ \hline & x_1 & x_2 \end{array}$$


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### **$D^*(2010)^+$ BRANCHING RATIOS**

#### $\Gamma(D^0 \pi^+)/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID	TECN	COMMENT	$\Gamma_1/\Gamma$
<b>0.677 ± 0.005 OUR FIT</b>				
<b>0.677 ± 0.006 OUR AVERAGE</b>				
0.6759 ± 0.0029 ± 0.0064	6,7,8 BARTELT	98	CLE2 $e^+ e^-$	
0.688 ± 0.024 ± 0.013	ALBRECHT	95F	ARG $e^+ e^- \rightarrow \text{hadrons}$	
0.681 ± 0.010 ± 0.013	6 BUTLER	92	CLE2 $e^+ e^- \rightarrow \text{hadrons}$	
<b>• • • We do not use the following data for averages, fits, limits, etc. • • •</b>				
0.57 ± 0.04 ± 0.04	ADLER	88D	MRK3 $e^+ e^-$	
0.44 ± 0.10	COLES	82	MRK2 $e^+ e^-$	
0.6 ± 0.15	8 GOLDHABER	77	MRK1 $e^+ e^-$	

#### $\Gamma(D^+ \pi^0)/\Gamma_{\text{total}}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_2/\Gamma$
<b>0.307 ± 0.005 OUR FIT</b>					
<b>0.3073 ± 0.0013 ± 0.0062</b>	6,7,8 BARTELT	98	CLE2 $e^+ e^-$		
<b>• • • We do not use the following data for averages, fits, limits, etc. • • •</b>					
0.312 ± 0.011 ± 0.008	1404	ALBRECHT	95F ARG	$e^+ e^- \rightarrow \text{hadrons}$	
0.308 ± 0.004 ± 0.008	410	6 BUTLER	92 CLE2	$e^+ e^- \rightarrow \text{hadrons}$	
0.26 ± 0.02 ± 0.02		ADLER	88D MRK3	$e^+ e^-$	
0.34 ± 0.07		COLES	82 MRK2	$e^+ e^-$	

#### $\Gamma(D^+ \gamma)/\Gamma_{\text{total}}$

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_3/\Gamma$
<b>0.016 ± 0.004 OUR FIT</b>						
<b>0.016 ± 0.005 OUR AVERAGE</b>						
0.0168 ± 0.0042 ± 0.0029		6,7 BARTELT	98	CLE2 $e^+ e^-$		
0.011 ± 0.014 ± 0.016	12	6 BUTLER	92	CLE2 $e^+ e^- \rightarrow \text{hadrons}$		

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.052	90	ALBRECHT	95F	ARG	$e^+ e^- \rightarrow$
0.17 $\pm 0.05$	$\pm 0.05$	ADLER	88D	MRK3	$e^+ e^-$
0.22 $\pm 0.12$		<sup>9</sup> COLES	82	MRK2	$e^+ e^-$

<sup>6</sup> The branching ratios are not independent, they have been constrained by the authors to sum to 100%.

<sup>7</sup> Systematic error includes theoretical error on the prediction of the ratio of hadronic modes.

<sup>8</sup> Assuming that isospin is conserved in the decay.

<sup>9</sup> Not independent of  $\Gamma(D^0\pi^+)/\Gamma_{\text{total}}$  and  $\Gamma(D^+\pi^0)/\Gamma_{\text{total}}$  measurement.

## D\*(2010) $^\pm$ REFERENCES

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